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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/577,457	05/24/2000	Mark Vincent Pierson	EN9-99-102	5505

7590 12/03/2002  
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EXAMINER

MITCHELL, JAMES M

ART UNIT	PAPER NUMBER
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2827

DATE MAILED: 12/03/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/577,457

Applicant(s)

PIERSON ET AL.

Examiner

James Mitchell

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 October 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-6, 10, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fox et al. (U.S. 4,954,878) and Alcoe (U.S. 2002/0046856) in combination with Okinaga (JP 63-52432).

Fox (Fig. 3, 4) discloses an electronic package comprising a semiconductor chip or die (16) inherently having an array of conductive pads on one surface thereof (via contact with solder balls, 63), a low modulus (Column 3, Line 64) flexible layer of dielectric material (52) serving as an interposer having an array of copper metal plated

vias (58; Column 4, Line 13) extending therethrough to opposing surfaces thereof with said array corresponding to an array of said conductive pads (shown as 86 in Fig.6) on said chip and with each said via terminating in a metal pad (54,56) on each of said opposing surfaces with each said metal pad on one of said surfaces connected by solder (inherent in solder joint, 63) to respective ones of said array of conductive pads on said chip, a substrate (30) having an array of conductive pad (62) corresponding to said array of metal pads on the other side of said surfaces of said flexible layer and connected by solder (63)

Fox doesn't appear to explicitly disclose that the substrate is a circuit card or that said vias are sloped with respect to said surfaces.

However Alcoe teaches that a circuit card is a substrate (Claim 6)

It would have been obvious to one of ordinary skill in the art to form the substrate of Fox as a circuit card in order to provide a substrate as taught by Aloe.

Okinaga (Fig 3) utilizes slanted plated through holes or vias sloped with surfaces.

It would have been obvious to one of ordinary skill in the art form sloped vias in the insulating material of Fox in order to reduce capacity and inductance as taught by Okinaga (English Abstract).

With respect to claims 4 and 12 the prior art discloses the claimed invention except that it does not appear to explicitly disclose that the thickness of the dielectric is 10 to 15 mils or that its elastic modulus is in the range of 50,000 to 400,000 psi. However, absent evidence of criticality, it would have been an obvious matter of design choice to form the thickness of the dielectric to be 10 to 15 mils, since such a

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modification would have involved a mere change in size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. In re Rose, 105 USPQ 237 (CCPA 1955); Gardner v Tac, 220 USPQ 777 (Fed Cir. 1984).

Further, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the range of elastic modulus between 50,000 and 400,000 psi in order to enhance compliant, since it has been held that where the general conditions of a claim disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233 (CCPA 1955).

With respect to the plated vias being copper, examiner takes official notice that it would have been obvious to one of ordinary skill in the art to plate the through hole with copper, because the metal is well known in the art in order to provide electrical contact between an interposer.

Claims 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over by Fox and Alcoe as applied to claim 5, and further in combination with Sado (U.S 4,330,165).

Neither Fox nor Alcoe appear to disclose that the through hole forms a V shaped metal plated via, however Sao utilizes a V shaped metal plated via.

It would have been obvious to one of ordinary skill in the art to form the through hole of Fox V shaped in order to facilitate absorption of local stress as taught by Sao (Abstract).

Furthermore, absent evidence of criticality, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable

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by routine experimentation and optimization to choose the particular dimensions of a sloped via or "V" shaped via because applicant has not disclosed that the dimensions are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, and it appears prima facie that the process would possess utility using another dimension. Indeed, it has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example, *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Claims 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over by Fox and Alcoe as applied to claim 6, and further in combination with Brodsky (U.S. 5,984,691).

Neither Fox nor Alcoe appear to explicitly disclose an array of holes therethrough positioned between an array of copper plated vias, however Brodsky (Fig. 1, 4) utilizes an array of holes (64) positioned between an array of vias.

It would have been obvious to one of ordinary skill in the art to incorporate an array of holes in the interposer of Fox and Aloe in order to reduce stress as taught by Brodsky (Column 7, Lines 8-9).

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fox and Alcoe as applied to claim 6, and further in combination with Isaacs et al. (U.S. 5,275,330).

Neither Fox or Alcoe appear to explicitly disclose that plated through holes (PTH) or vias are filled with solder, however Isaacs (Fig 9) utilizes a PTH filled with solder.

It would have been obvious to one of ordinary skill in the art to fill the PTH or via of the prior art with solder in order to prevent unreliable electrical connections as taught by Isaacs (Abstract).

### ***Response to Arguments***

Applicant's arguments filed October 21, 2002 have been fully considered but they are not persuasive. Applicant contends that the Fox reference deals with another problem, however the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). As for applicant's contention that claimed invention is different because interposer is alleged to be a floating interposer is moot since that limitation is not recited in the claims. Likewise applicant's argument relating to the TDK reference is moot since the reference is no longer relied on in this office actions rejection. Lastly, applicant's contention that the Brodsky reference does not employ an array as claimed by applicant is moot since Brodsky explicitly discloses (e.g. Fig 4) an array of holes between plated vias.

### ***Conclusion***

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Mitchell whose telephone number is (703) 305-0244. The examiner can normally be reached on M-F 10:30-8:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on (703) 305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3432 for regular communications and (703) 305-3230 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



jmm

December 2, 2002



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